WE CLAIM:

1. A process for regenerating non-combustible sorbents comprising one or more combustible impurities comprising phosphorus, said process comprising:

providing one or more spent non-combustible sorbents comprising a content of said one or more combustible impurities comprising phosphorus;

exposing said one or more non-combustible sorbents to regeneration conditions effective to remove said combustible impurities comprising phosphorus and to produce a regenerated sorbent effective to sorb 80 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

2. The process of claim 1 wherein said combustible impurities comprising phosphorus comprise basic combustible impurities comprising phosphorus.

3. The process of claim 2 wherein said regenerated sorbent is effective to sorb 90 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

4. The process of claim 2 wherein said regenerated sorbent is effective to sorb 95 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

5. The process of claim 2 wherein said regenerated sorbent is effective to sorb substantially all of said content of one or more combustible impurities comprising phosphorus.

6. The process of claim 5 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 200°C to about 700°C.

7. The process of claim 5 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 450°C to about 600°C.

8. The process of claim 6 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

9. The process of claim 7 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

10. The process of claim 8 wherein said oxygen containing atmosphere is selected from the group consisting of air, oxygen gas, and a combination of oxygen gas with nitrogen gas.

11. The method of claim 8 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

12. The method of claim 8 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

13. The method of claim 9 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

14. The method of claim 9 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

15. The process of claim 9 wherein said oxygen containing atmosphere comprise1s nitrogen and about 0.5 to about 1% oxygen.

16. The process of claim 15 further comprising a pressure from about 0.01 MPa to about 50 MPa.

17. The process of claim 15 further comprising a pressure from about 0.1 MPa to about 10 MPa.

18. The process of claim 16 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

19. The process of claim 17 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

20. The process of claim 17 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 25 °C or less.

21. The method of claim 5 further comprising:

providing an olefin feed comprising a content of phosphorus-containing impurities;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

22. The method of claim 21 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

23. The method of claim 22 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

24. The process of claim 23 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

25. The process of claim 21 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

26. The process of claim 21 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.

27. A process for regenerating non-combustible sorbents comprising one or more impurities comprising phosphorus, said process comprising:

providing one or more spent non-combustible sorbents comprising a content of said one or more combustible impurities comprising phosphorus, said one or more sorbents comprising a non-combustible support comprising a metal selected from the group consisting of Sc, V, Cr, Fe, Co, Ni, Cu, Zn, Zr, Nb, Mn, Ag and combinations thereof; and

exposing said one or more non-combustible sorbents to regeneration conditions effective to remove combustible impurities comprising phosphorus and to produce a regenerated sorbent effective to sorb 80 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

28. The process of claim 27 wherein said combustible impurities comprising phosphorus comprise basic combustible impurities comprising phosphorus.

29. The process of claim 28 wherein said regenerated sorbent is effective to sorb 90 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

30. The process of claim 28 wherein said regenerated sorbent is effective to sorb 95 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

31. The process of claim 28 wherein said regenerated sorbent is effective to sorb substantially all of said content of one or more combustible impurities comprising phosphorus.

32. The process of claim 31 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 200°C to about 700°C.

33. The process of claim 31 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 450°C to about 600°C.

34. The process of claim 32 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

35. The process of claim 33 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

36. The process of claim 34 wherein said oxygen containing atmosphere is selected from the group consisting of air, oxygen gas, and a combination of oxygen gas with nitrogen gas.

37. The method of claim 34 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

38. The method of claim 34 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

39. The method of claim 35 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

40. The method of claim 35 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

41. The process of claim 35 wherein said oxygen containing atmosphere comprises nitrogen and from about 0.5% to about 1% oxygen.

42. The process of claim 38 further comprising a pressure from about 0.01 MPa to about 50 MPa.

43. The process of claim 41 further comprising a pressure from about 0.1 MPa to about 10 MPa.

44. The process of claim 42 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

45. The process of claim 43 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

46. The process of claim 42 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from

about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 25 °C or less.

47. The method of claim 28 wherein said non-combustible support is selected from the group consisting of acidic zeolite, acidic alumina, and neutral alumina.

48. The method of claim 46 wherein said non-combustible support is selected from the group consisting of acidic zeolite, acidic alumina, and neutral alumina.

49. The method of claim 31 further comprising:

providing an olefin feed comprising a content of said combustible impurities comprising phosphorus;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

50. The method of claim 42 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

51. The method of claim 49 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

52. The process of claim 50 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

53. The process of claim 51 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

54. The process of claim 51 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.

55. A process for regenerating non-combustible sorbents comprising one or more impurities comprising phosphorus, said process comprising:

providing one or more spent non-combustible sorbents comprising a content of said one or more combustible impurities comprising phosphorus, comprising a metal selected from the group consisting of Cu, Ag and combinations thereof, and comprising a support selected from the group consisting of acidic zeolite, acidic alumina, and neutral alumina; and

exposing said one or more non-combustible sorbents to regeneration conditions effective to produce a regenerated sorbent effective to sorb a majority of said content of said one or more combustible impurities comprising phosphorus or more.

56. The process of claim 55 wherein said combustible impurities comprising phosphorus comprise basic combustible impurities comprising phosphorus.

57. The process of claim 56 wherein said regenerated sorbent is effective to sorb 90 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

58. The process of claim 56 wherein said regenerated sorbent is effective to sorb 95 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

59. The process of claim 56 wherein said regenerated sorbent is effective to sorb substantially all of said content of one or more combustible impurities comprising phosphorus.

60. The process of claim 59 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 200°C to about 700°C.

61. The process of claim 59 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 450°C to about 600°C.

62. The process of claim 60 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

63. The process of claim 61 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

64. The process of claim 62 wherein said oxygen containing atmosphere is selected from the group consisting of air, oxygen gas, and a combination of oxygen gas with nitrogen gas.

65. The method of claim 62 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

66. The method of claim 62 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

67. The method of claim 63 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

68. The method of claim 63 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

69. The process of claim 63 wherein said oxygen containing atmosphere comprises nitrogen and from about 0.5% to about 1% oxygen.

70. The process of claim 68 further comprising a pressure from about 0.01 MPa to about 50 MPa.

71. The process of claim 69 further comprising a pressure from about 0.1 MPa to about 10 MPa.

72. The process of claim 70 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

73. The process of claim 71 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

74. The process of claim 70 wherein

said oxygen containing atmosphere is supplied at a flow rate of from about 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from

about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 25 °C or less.

75. The method of claim 69 further comprising:

providing an olefin feed comprising a content of said combustible impurities comprising phosphorus;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

76. The method of claim 75 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

77. The method of claim 76 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

78. The process of claim 77 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

79. The process of claim 78 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

80. The process of claim 78 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.

81. A process for regenerating non-combustible sorbents comprising one or more combustible impurities comprising phosphorus, said process comprising:

providing one or more spent, non-combustible sorbents comprising one or more combustible impurities comprising phosphorus, said spent, non-combustible sorbents comprising a metal selected from the group consisting of Cu, Ag and combinations thereof, and comprising a support comprising acidic alumina; and,

exposing said spent sorbents to regeneration conditions consisting essentially of a quantity of a gas comprising from about 0.5 to about 21% oxygen with the remainder being nitrogen a temperature of from about 450°C to about 600°C and a pressure of from about 0.1 MPa to about 10 MPa,

at a flow rate and for a time effective to produce a regenerated sorbent effective to sorb a majority of said content of combustible impurities comprising phosphorus or more.

82. The process of claim 81 wherein said combustible impurities comprising phosphorus comprise basic combustible impurities comprising phosphorus.

83. The process of claim 82 wherein said regenerated sorbent is effective to sorb 90 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

84. The process of claim 82 wherein said regenerated sorbent is effective to sorb 95 wt.% or more of said content of one or more combustible impurities comprising phosphorus.

85. The process of claim 82 wherein said regenerated sorbent is effective to sorb substantially all of said content of one or more combustible impurities comprising phosphorus.

86. The process of claim 82 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 200°C to about 700°C.

87. The process of claim 82 wherein said regeneration conditions consist essentially of a quantity of oxygen and a temperature from about 450°C to about 600°C.

88. The process of claim 86 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

89. The process of claim 87 wherein said quantity of oxygen comprises an oxygen containing atmosphere.

90. The process of claim 88 wherein said oxygen containing atmosphere is selected from the group consisting of air, oxygen gas, and a combination of oxygen gas with nitrogen gas.

91. The method of claim 88 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

92. The method of claim 88 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

93. The method of claim 89 wherein said quantity of oxygen is about 0.001% or more of said oxygen containing atmosphere.

94. The method of claim 89 wherein said quantity of oxygen is from about 0.5 to about 21% of said oxygen containing atmosphere.

95. The process of claim 89 wherein said oxygen containing atmosphere comprises nitrogen and from about 0.5% to about 1% oxygen.

96. The process of claim 92 further comprising a pressure from about 0.01 MPa to about 50 MPa.

97. The process of claim 95 further comprising a pressure from about 0.1 MPa to about 10 MPa.

98. The process of claim 96 wherein

said flow rate is from 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

99. The process of claim 97 wherein

said flow rate is from 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 100 °C.

100. The process of claim 97 wherein

said flow rate is from 0.001 to about 50 liters/hour per gram catalyst;

said temperature is maintained from

about 0.5 hour to about 200 hours; and,

said spent sorbent is cooled to at least about 25 °C or less.

101. The method of claim 85 further comprising:

providing an olefin feed comprising a content of said combustible impurities comprising phosphorus;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

102. The method of claim 101 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

103. The method of claim 102 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

104. The process of claim 103 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

105. The process of claim 104 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

106. The process of claim 105 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.

107. A process for regenerating non-combustible sorbents comprising combustible impurities comprising phosphorus, said process comprising:

providing one or more spent, non-combustible sorbents selected from the group consisting of acidic zeolite, acidic alumina, and neutral alumina, said one or more spent, non-combustible sorbents comprising at least one combustible impurity comprising phosphorus; and

exposing said one or more spent, non-combustible sorbents to regeneration conditions consisting essentially of a quantity of a gas comprising from about 0.5 to about 21% oxygen with the remainder being nitrogen a temperature from about 450°C to about 600°C, a pressure from about 0.1 MPa to about 10 MPa at a flow rate and for a time effective to produce a regenerated sorbent effective to sorb at least 95 wt.% of said content of combustible impurities comprising phosphorus or more.

108. The method of claim 107 further comprising:

providing an olefin feed comprising a content of said combustible impurities comprising phosphorus;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

109. The method of claim 108 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

110. The method of claim 109 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

111. The process of claim 110 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

112. The process of claim 111 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

113. The process of claim 111 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.

114. A process for regenerating acidic alumina comprising at least one combustible impurity comprising phosphorus, said process comprising:

providing a spent sorbent consisting essentially of acidic alumina comprising a content of at least one combustible impurity comprising phosphorus; and

exposing said spent sorbent to regeneration conditions consisting essentially of a quantity of a gas comprising from about 0.5 to about 21% oxygen with the remainder being nitrogen, a temperature from about 450°C to about 600°C, a pressure from about 0.1 MPa to about 10 MPa, at a flow rate and for a time effective to produce a regenerated sorbent effective to sorb a majority of said content of said combustible impurities comprising phosphorus or more.

115. The process of claim 114 wherein said combustible impurities comprising phosphorus comprise basic combustible impurities comprising phosphorus.

116. The method of claim 115 further comprising:

providing an olefin feed comprising a content of said combustible impurities comprising phosphorus;

contacting said olefin feed with said one or more sorbents under sorbing conditions and for a time effective to produce a purified olefin feed and said one or more spent sorbents.

117. The method of claim 116 further comprising contacting said purified olefin feed with a skeletal isomerization catalyst under conditions effective to yield skeletally isomerized olefins.

118. The method of claim 117 further comprising converting said skeletally isomerized olefins into a primary alcohol composition.

119. The process of claim 118 wherein said converting comprises hydroformylating said skeletally isomerized olefin.

120. The process of claim 119 wherein said purified olefin feed consists of about 1 ppm or less of said phosphorus-containing impurities.

121. The process of claim 120 wherein said purified olefin feed consists of about 0.5 ppm or less of said phosphorus-containing impurities.